

Abstract for The American Shore and Beach Preservation 2005 Fall Conference:

Branchbox Breakwater Design for Section 227 Demonstration Project at Pickleweed Trail, Martinez, CA

by

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The city of Martinez is located in Northern California's Contra Costa County, between San Pablo Bay and Suisun Bay. Pickleweed Trail is located within the Martinez Regional Shoreline Park in Martinez. The demonstration project area extends approximately 1000 m along the southern shore of Carquinez Strait, adjacent to the Union Pacific Railroad right of way. The trail is a recreational hiking trail and is maintained by the East Bay Regional Park District. The site includes coastal wetland habitat that provides habitat for a variety of species. Pickleweed Trail is experiencing erosion due to what appears to be some combination of tidal currents, vessel wake, and wind wave action. This erosion is adding sediment to a Federal navigation channel, is encroaching on the recreational hiking trail, and is also destroying potentially critical habitat for the California Clapper Rail, the California Least Tern, and the Salt Marsh Harvest Mouse, all of which are classified as threatened or endangered species. Attempts to control erosion with riprap armoring have brought limited success in adjacent areas. According to trail users familiar with the area, erosion is claiming approximately 1.5 m (5 ft) of shoreline per year in the unprotected areas. Pickleweed Trail has been chosen as a site for the implementation of a bioengineered structure under the Section 227 Program (National Shoreline Erosion Control and Demonstration Program). The demonstration project goal is to test the effectiveness of a bioengineered "branch box" structure at reducing wave-induced erosion in an estuarine environment. This project will also result in the reestablishment of previously lost critical habitat. The traditional design for a branchbox breakwater calls for the placement of bundles of small dead branches between vertically-placed poles or piles. Both the traditional and alternate designs are being considered for Martinez. Two previous uses of branch box breakwaters on the Kanawha River and on a lake in Wisconsin have used anchored bundles of woody material rather than two rows of piling to confine the woody material. On the Kanawha River, rather than using branches, "slabs" from a lumber operation were constructed in bundles. Slabs are the by-product from a lumber operation and consist of the outer rounded edge of the tree. The slabs are securely bundled together and anchored in place with cables using either duck-bill or screw-in anchors. Slab bundles used on the Kanawha River are about 3 ft diameter and 8 ft long. Flume tests of the effectiveness of branchbox breakwaters at wave energy reduction have been completed and a conceptual design developed for Martinez. If funded under the 227 Program, the San Francisco District is considering construction with in-house labor in-keeping with the concept of a low cost shore protection technique not requiring a large contractual effort.

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